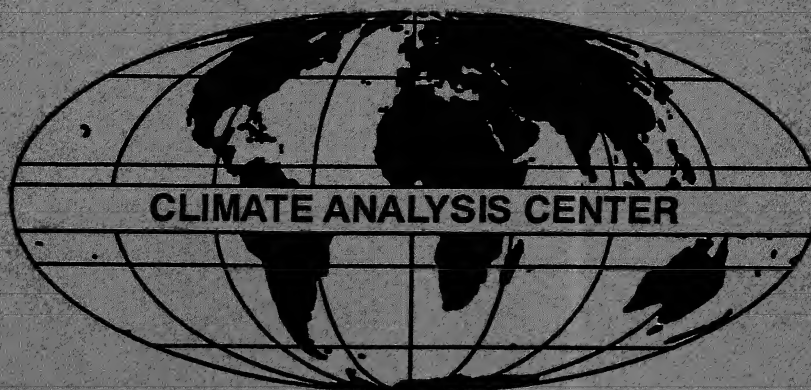


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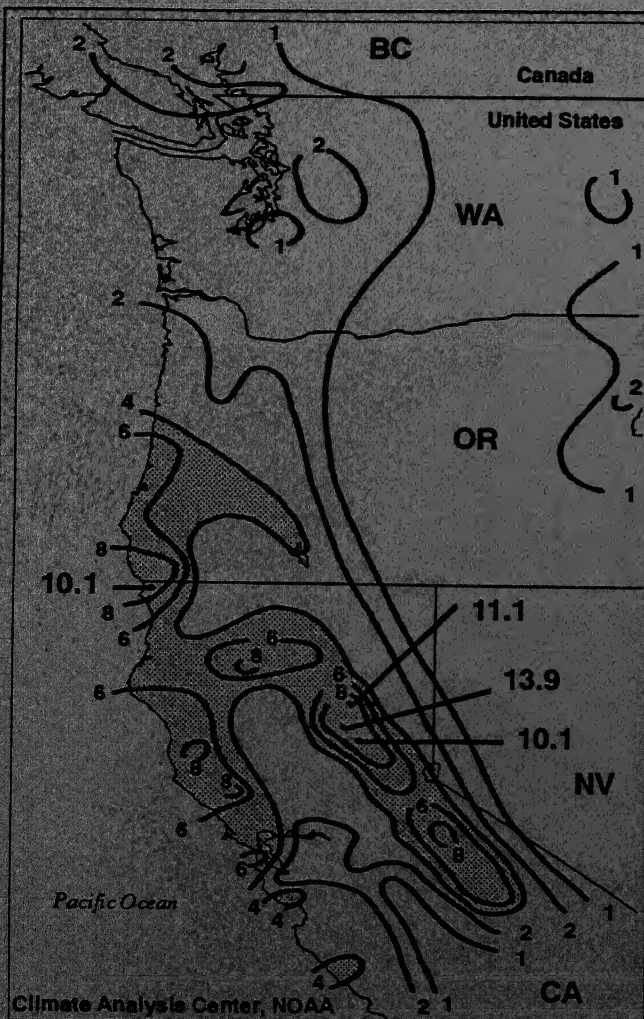
UPDATE ON
SOUTHERN
HEMISPHERE
RAINY
SEASON

WEEKLY CLIMATE BULLETIN

No. 93/01

Washington, DC

January 6, 1993



TOTAL PRECIPITATION (INCHES)

December 26, 1992 – January 3, 1993

Isopleths drawn for 1, 2, 4, 6, and 8 inches.

Based on reports received from the River Forecast Centers.

Shaded areas received over 4 inches.

STRONG STORMS POUND THE WEST. A series of powerful storms delivered abundant rains to the central Pacific Coast and heavy snows to the Cascades and Sierra Nevadas. Some locations in the northern California mountains were buried under eight to eleven feet of snow. According to press reports, major highways were closed several times as snowplows battled to keep main arteries and mountain passes cleared. Precipitation amounts approached fourteen inches at some locations, and extensive areas of northern California and southwestern Oregon received totals of more than four inches. Heavy precipitation since early December has been beneficial in improving the water level in severely depleted reservoirs and increasing the mountain snowpack, currently at 110% to 140% of normal across the Sierra Nevadas; however, timely additional precipitation is needed to prevent a seventh year of drought.



UNITED STATES DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL WEATHER SERVICE-NATIONAL METEOROLOGICAL CENTER

CLIMATE ANALYSIS CENTER



GLOBAL CLIMATE HIGHLIGHTS

MAJOR CLIMATIC EVENTS AND ANOMALIES AS OF JANUARY 2, 1993

1. Western and North-Central United States:

STORMS BATTER REGION.

A series of winter storms dumped more heavy snow on the northern Sierra Nevadas, Cascades, and northern Rockies [2 weeks] and brought unusually cold weather to the northern tier of states from Washington to Minnesota, with weekly temperature departures dipping to -18°C in Montana [6 weeks]. According to press reports, the wintry weather closed many major highways and forced Amtrak to interrupt rail service between Chicago and Seattle.

2. Central United States:

WET SPELL ENDS.

Less than 10 mm of precipitation fell on the southern Plains, but amounts locally approached 70 mm in the western and southern Great Lakes region, where icing disrupted road travel. Despite this precipitation, moisture surpluses have declined dramatically during the last few weeks [Ended at 8 weeks].

3. Central South America:

MORE WET WEATHER.

Weekly precipitation totals ranged from 40 to 200 mm, with the heaviest totals recorded in northern Uruguay and adjacent parts of Brazil and Argentina. Six-week moisture surpluses approached 300 mm at some locations [8 weeks].

4. Northern and Central Europe:

DRIER CONDITIONS REPORTED.

Generally less than 15 mm of precipitation fell, although scattered locations in Norway and Sweden received amounts of 20 to 70 mm [Ended at 13 weeks].

5. Southwestern Europe and Northwestern Africa:

MOST LOCATIONS STILL DRY.

Little or no precipitation was reported across most of the region, but some locations along the immediate Mediterranean coasts of the southern Iberian Peninsula, northern Morocco, and northern Algeria were soaked by up to 130 mm [7 weeks].

6. Eastern Europe, Southwestern Asia, and Northeastern Africa:

WINTRY CONDITIONS SPREAD.

Temperature departures ranged from -4°C to -8°C across most of the region, dipping to -14°C in sections of eastern Europe as cold air plunged as far south as Egypt and Syria. According to press reports, snow whitened the island of Sicily for the first time in many years while near blizzard conditions afflicted parts of Turkey [7 weeks].

7. Southern Iran and Western Pakistan:

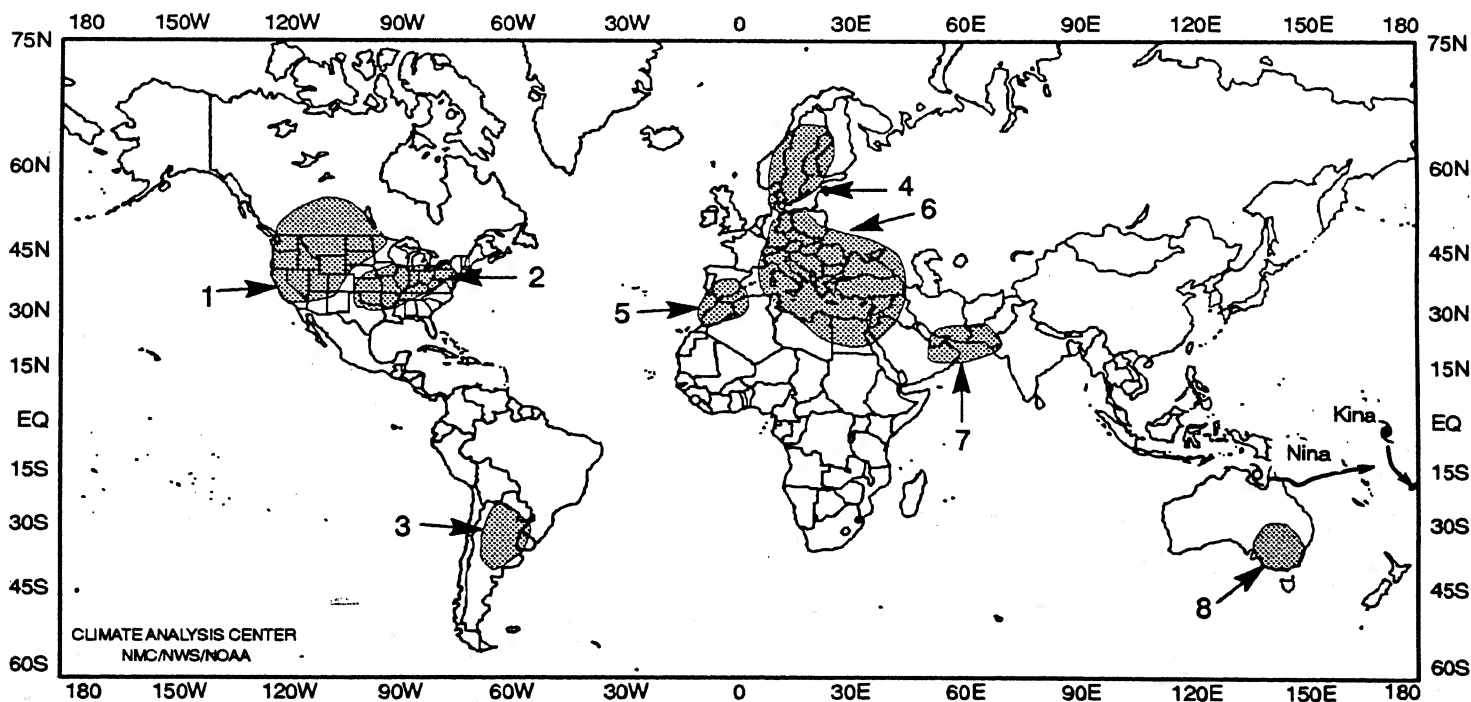
HEAVY RAINS CONTINUE.

As much as 70 mm of rain drenched the area as unusually wet weather persisted [4 weeks].

8. Southeastern Australia:

TEMPERATURES RETURN TO NORMAL, BUT RAINS PERSIST.

Near normal temperatures prevailed across most of the country [Ended at 8 weeks]. Up to 30 mm of rain dampened New South Wales and Victoria. Since mid-November, moisture surpluses climbed to 150 mm at some locations [5 weeks].



EXPLANATION

TEXT: Approximate duration of anomalies is in brackets. Precipitation amounts and temperature departures are this week's values.

MAP: Approximate locations of major anomalies and episodic events are shown. See other maps in this Bulletin for current two week temperature anomalies, four week precipitation anomalies, long-term anomalies, and other details.

UNITED STATES WEEKLY CLIMATE HIGHLIGHTS

FOR THE WEEK OF DECEMBER 27, 1992 – JANUARY 2, 1993

Fierce winter storms battered much of the nation from northern California and the Pacific Northwest to the upper Mississippi Valley during most of the week. High winds, heavy rain, freezing rain, heavy snow, and low temperatures forced the closure of major roads and rail service, stranded numerous motorists, caused power outages, and collapsed roofs. The Sierra Nevada's worst storms in several years dumped up to eleven feet of snow on the higher elevations while as much as eight feet of snow buried the Mount Shasta area. The Empire Builder Amtrak rail line between St. Paul, MN and Seattle, WA was shut down because cold air and drifting snow knocked out signals, locked switches, froze water supplies in passenger cars, and stalled locomotives, according to press reports. The heavy precipitation was highly beneficial in restoring low reservoirs in California and improving mountain snowpack, but state water officials said more precipitation is still needed to stop the current drought from continuing through a seventh year. Farther east, a major storm late in the week spread a sheet of ice from the Plains into the Midwest, making driving impossible on many roads and causing numerous traffic accidents. According to press reports, fourteen deaths in Texas, Oklahoma, Missouri, Iowa, and Wisconsin were caused by the storm. Sleet and freezing rain also iced highways from North Carolina to New England on Monday, shutting down mass transit and causing more accidents and several deaths.

At the start of the week, Arctic air invaded the northern Intermountain West, northern Rockies, and northern Plains. Blizzard conditions prevailed in Montana and Idaho, where up to foot of snow buried higher elevations. A combination of rain, freezing rain, sleet, and snow persisted across the lower Ohio Valley, Southeast, and central Appalachians while rain was reported in southern California and Arizona. On Monday, freezing rain spread up the Atlantic seaboard while an intense low pressure system off the northern Pacific coast remained stationary, bringing heavy snow to Washington, Oregon, Idaho, Montana, and the higher elevations of California and Nevada. On Tuesday, the winter storm continued to hammer the West with rain over the lower elevations of the Pacific Coast states, Arizona, and New Mexico and snow over most of the northern and central Intermountain West, northern and central Rockies, and higher elevations of the Pacific Coast states. Sustained winds reached 66 mph in Utah, with gusts to 96 mph reported. High winds and low temperatures continued to buffet the northern Plains, while warm moist air flowed into the southern Plains and the lower and middle Mississippi and Ohio Valleys.

At mid-week, the low-pressure system off the northern Pacific coast weakened as snow lingered over the western states. Farther east, freezing rain and very cold air plagued the northern

Plains, the upper Mississippi Valley, the upper Great Lakes, northern Atlantic Coast states. As much as ten inches of snow keted northern Minnesota while freezing rain and drizzle hazardous driving conditions across Iowa, southeastern Nebraska and northwestern Missouri. Abnormally warm weather prevailed from eastern Texas to the lower Great Lakes and mid-Atlantic. Thirteen new daily high temperature records were established during the latter part of the week, the Pacific low pressure strengthened as it moved southeastward, bringing more snow to northern California and the Northwest. Meanwhile, storm system dropped freezing rain on much of the Plains, Mississippi and Ohio Valleys, and Great Lakes. Snow fell in northern New England while rain showers soaked southern Florida, where the greatest weekly amounts since mid-November were observed. As the week ended, snow persisted in the northern and central Rockies, but dry weather prevailed over much of the remainder of the nation.

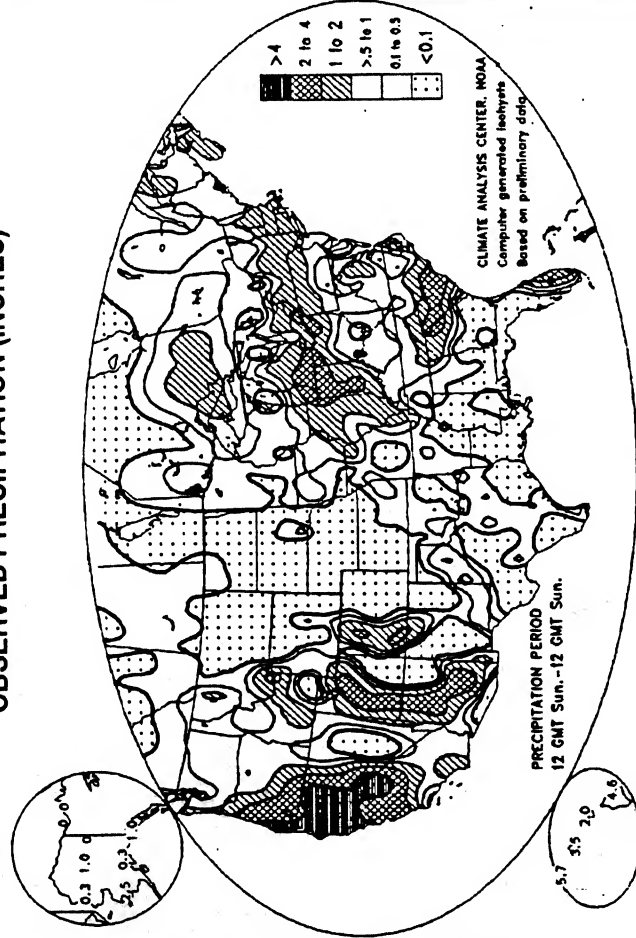
According to the River Forecast Centers, the weekly precipitation totals (between four and fourteen inches) across northern California and southwestern Oregon, with the highest amounts measured across the northern Sierras. More than two inches of precipitation fell on much of the remainder of the Pacific Northwest, northern and central California, from the eastern Pacific Basin southward to central Arizona, along the southeastern Florida coast, from northeastern Georgia eastward to southeastern North Carolina, from the central Ohio Valley northeastward to the Great Lakes, across Hawaii, and at scattered locations across the central Rockies and southwestern Alaska. Light to moderate amounts were observed in the remainders of the contiguous United States and Alaska.

Temperatures averaged well above normal from the northern Intermountain West to the lower Mississippi Valley through most of the nation east of the Mississippi River. Weekly departures reaching +11°F in the southern Rockies, Ohio Valley, and lower Great Lakes. In Alaska, temperatures averaged well above normal everywhere but the panhandle. Weekly departures reaching +27°F in the southwest.

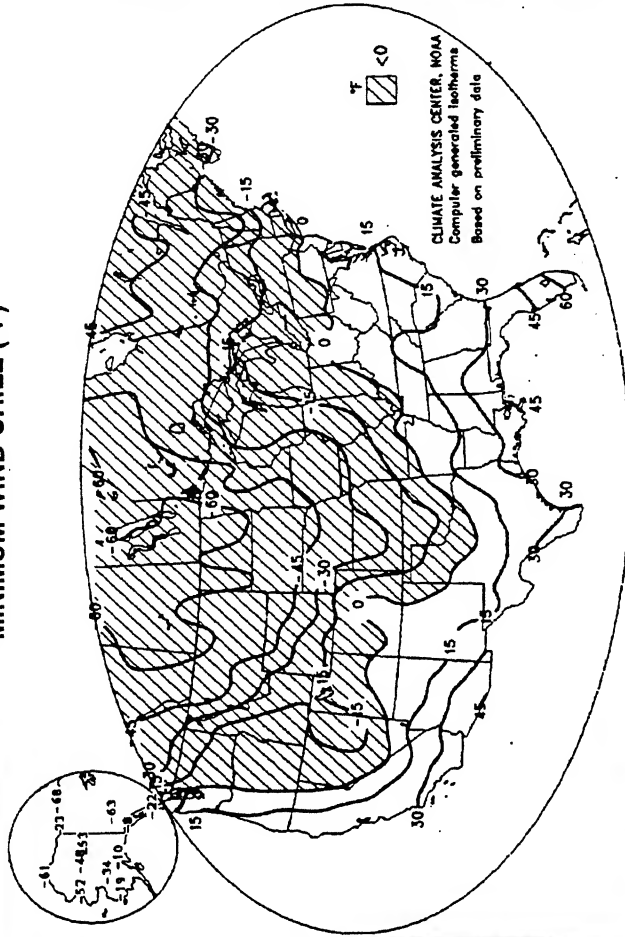
In sharp contrast, bitterly cold air persisted across the Northwest, northern Rockies, and northern Plains and plunged into the central Plains and upper Mississippi Valley during the latter part of the week. Weekly departures between -9°F and -33°F were observed from the northern Rockies eastward to the northern Plains. The low temperatures combined with high wind to produce minimum wind chills of -60°F over the northern High Plains. Low normal temperatures were also observed along the Atlantic panhandle, with departures down to -12°F.

UNITED STATES WEEKLY CLIMATE CONDITIONS (December 27, 1992 – January 2, 1993)

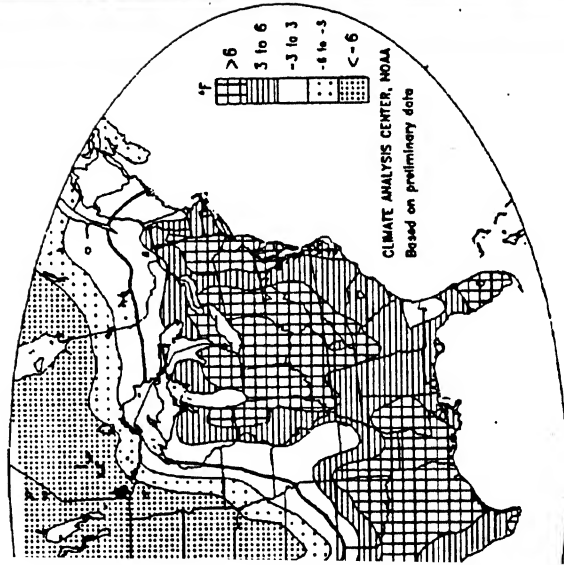
OBSERVED PRECIPITATION (INCHES)



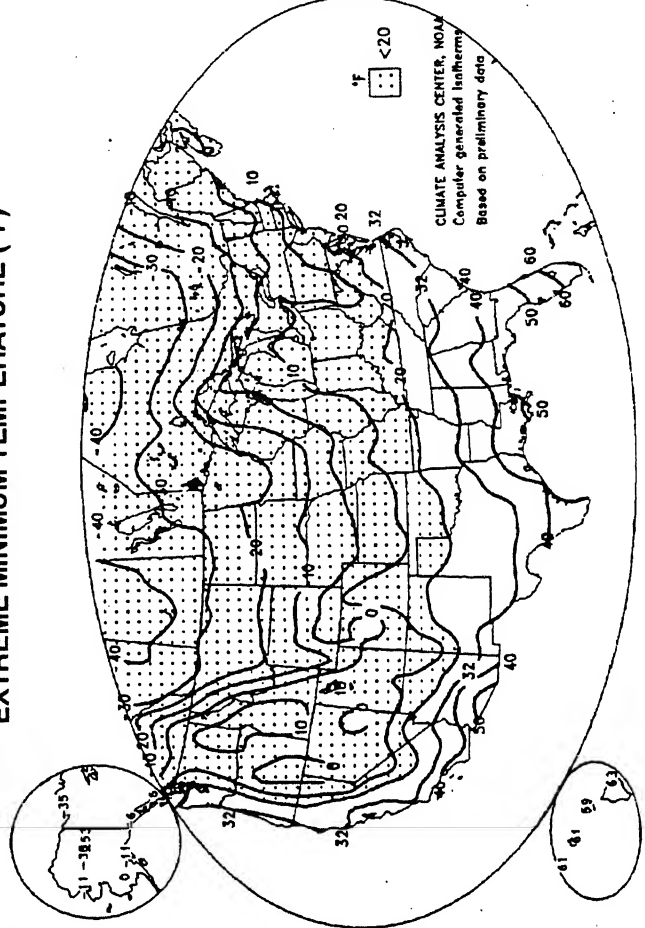
MINIMUM WIND CHILL (°F)



DEPARTURE OF AVERAGE TEMPERATURE FROM NORMAL (°F)

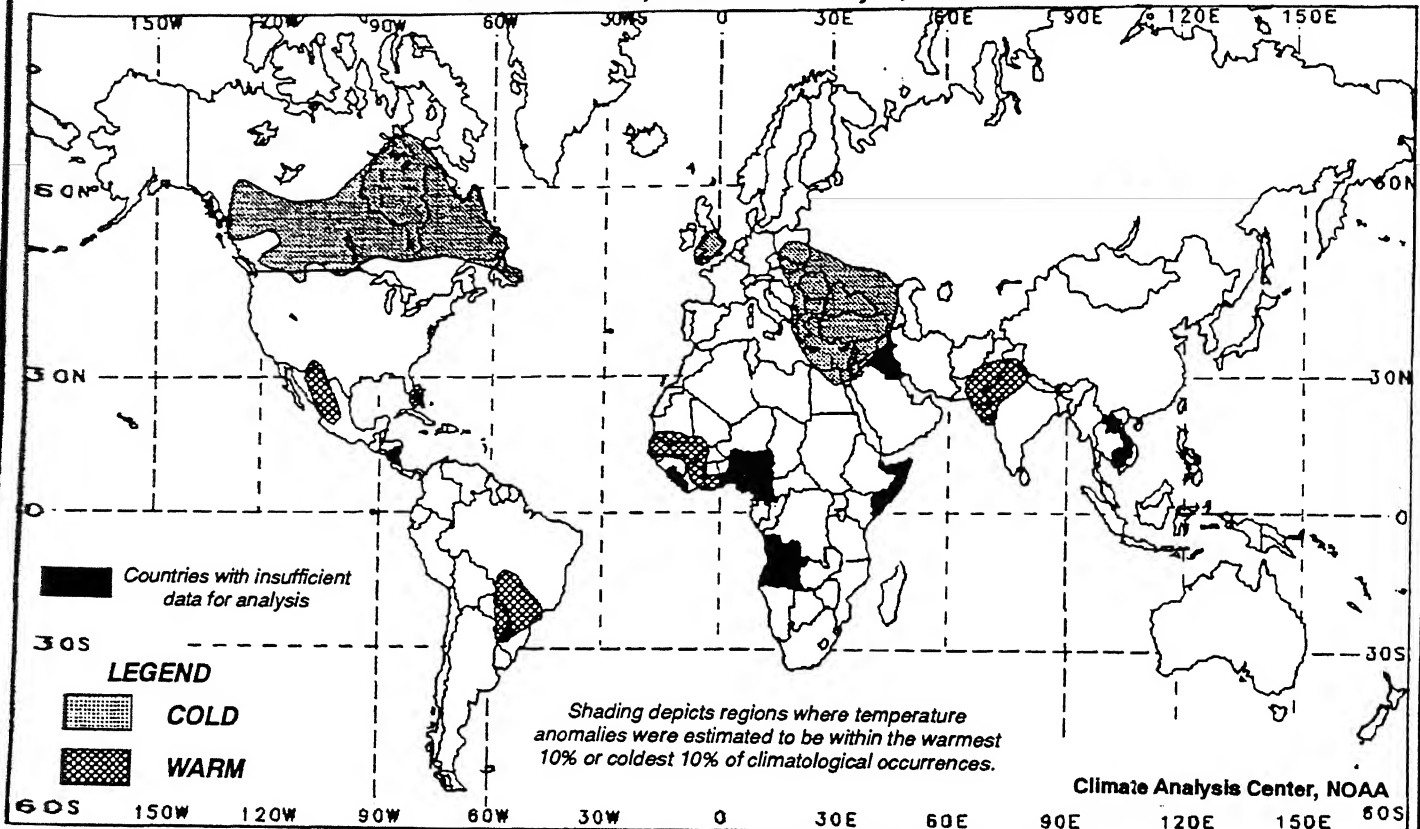


EXTREME MINIMUM TEMPERATURE (°F)



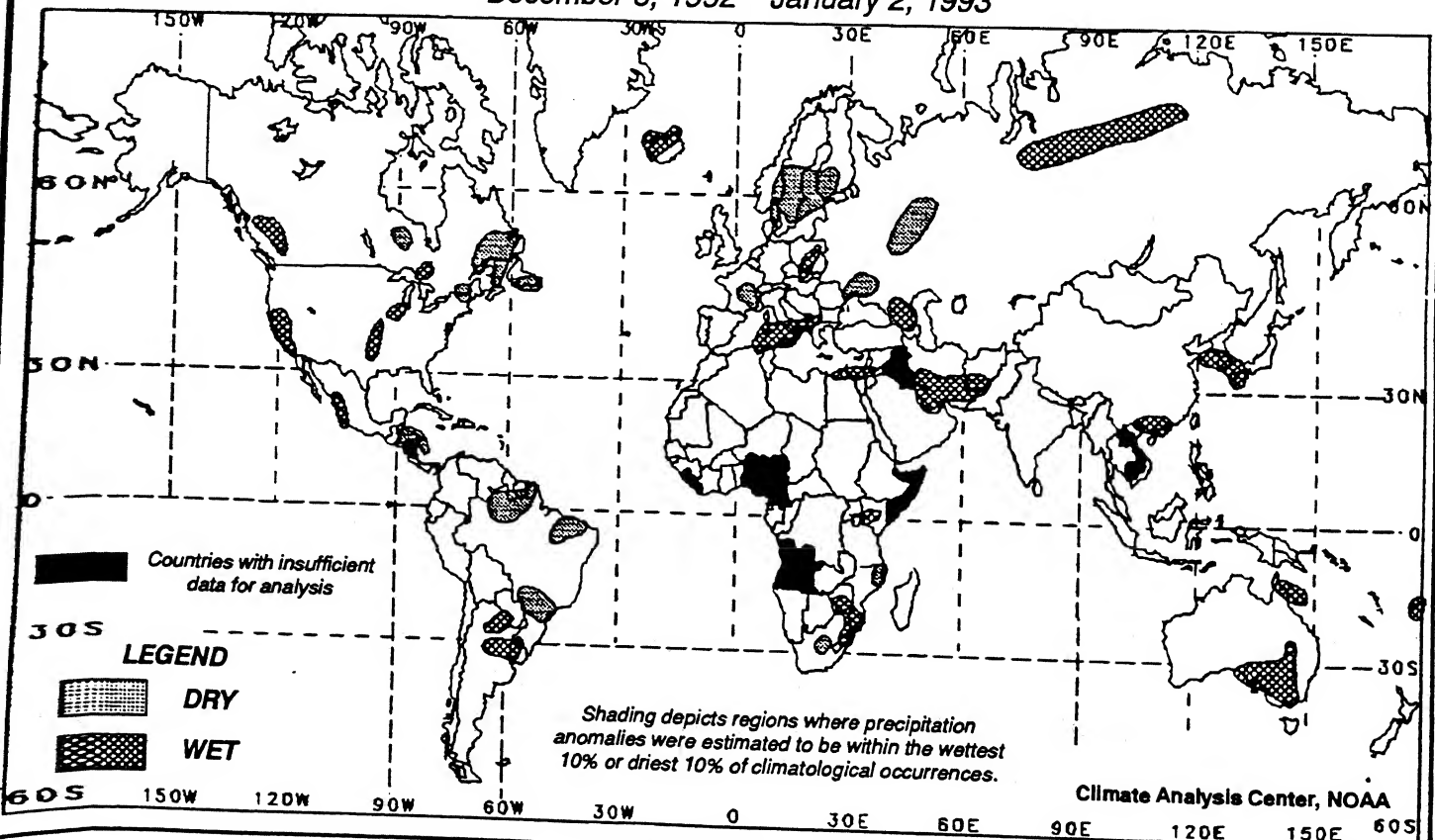
TWO-WEEK GLOBAL TEMPERATURE ANOMALIES

December 20, 1992 – January 2, 1993



FOUR-WEEK GLOBAL PRECIPITATION ANOMALIES

December 6, 1992 – January 2, 1993



SPECIAL CLIMATE SUMMARY

*Analysis and Information Branch
Climate Analysis Center, NMC
National Weather Service, NOAA*

UPDATE ON SOUTHERN HEMISPHERE RAINY SEASON

Precipitation falls in a distinct pattern across eastern Australia, southern Africa, and east-central South America, with the bulk of the annual rainfall observed during approximately October – April. More than 75% of the normal annual precipitation typically falls during this seven-month period across central and northern Queensland, all of southern Africa (except southwestern Namibia, central and western South Africa, and the immediate coastlines of Natal and southern Mozambique), the western half of Argentina, most of Bolivia, and Brazil north of central Mato Grosso do Sul and central Sao Paulo, including all of Minas Gerais. Across the central and western Cape York Peninsula, northern Namibia, the northern half of Botswana, all but south-eastern Zimbabwe, most of Malawi, Zambia, northwestern Mozambique, southwestern Bolivia, and northwestern Minas Gerais, over 90% of normal annual precipitation typically falls during October – April.

EASTERN AUSTRALIA (Figures 1 and 2): Abnormally dry conditions afflicted much of eastern Australia during the 1991–1992 rainy season, but the cooler months of the year (May – September) brought persistently above normal precipitation to most of New South Wales, Victoria, and Tasmania which occasionally brought showers northward into central and northern Queensland.

Unfortunately, the 1992–1993 rainy season got off to a slow start across northern and eastern Queensland, with considerably below normal rainfall totals measured during October and November. Farther south, however, the abundant precipitation that dominated earlier in the year continued into the rainy season. Southern and western New South Wales and most of Victoria were consistently damp through the beginning of 1993, with the largest weekly totals observed around mid-December (100–200 mm). According to press reports, the persistently heavy rains may have significantly impacted the wheat crop, more than one-third of which had not been harvested when the heaviest rains fell in mid-December. It is expected, however, that the country's wheat output will still be higher than last year's drought-affected total.

Farther north, heavier December precipitation partially alleviated the abnormally dry October and November across central and southeastern Queensland, but most locations still observed subnormal rainfall during October 1, 1992 – January 2, 1993. In sharp contrast, slightly drier than normal weather on the Cape York Peninsula during the first two months of the rainy season became a distant memory in December. Slowly-moving Tropical Storm Nina fueled inundating rainfall from mid-December through early January, bringing seasonal amounts through January 2 up to 200% to 420% of normal. During the two weeks covering mid-December, as much as 500 – 700 mm of rain deluged parts of the Cape York Peninsula.

SOUTHERN AFRICA (Figures 3 and 4): A slow start to the 1992–1993 rainy season is exactly what southern Africa did not need following one of the driest rainy seasons of the century (1991–1992); unfortunately, abnormally low precipitation totals

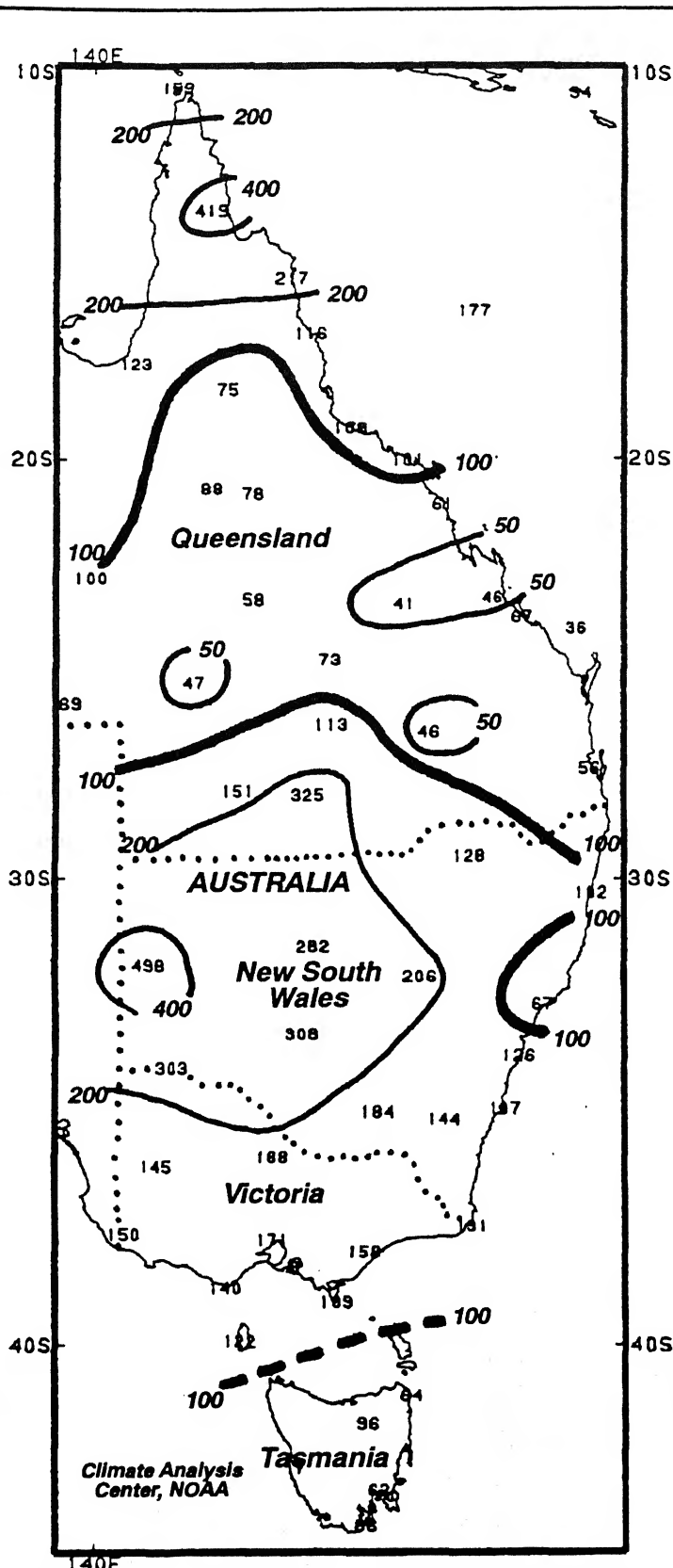


FIGURE 1. Percent of Normal Precipitation across Eastern Australia, October 1, 1992 – January 2, 1993 [94 days]. A station required at least 75 daily reports (80%) for inclusion. Isopleths drawn for 50%, 100%, 200%, and 400%. Heavy rains totaled between two and five times the normal amounts across most of central and western New South Wales and adjacent southern Queensland and northern Victoria. In contrast, a slow start to the wet season contributed to subnormal precipitation through central, east-central, and southeastern Queensland.

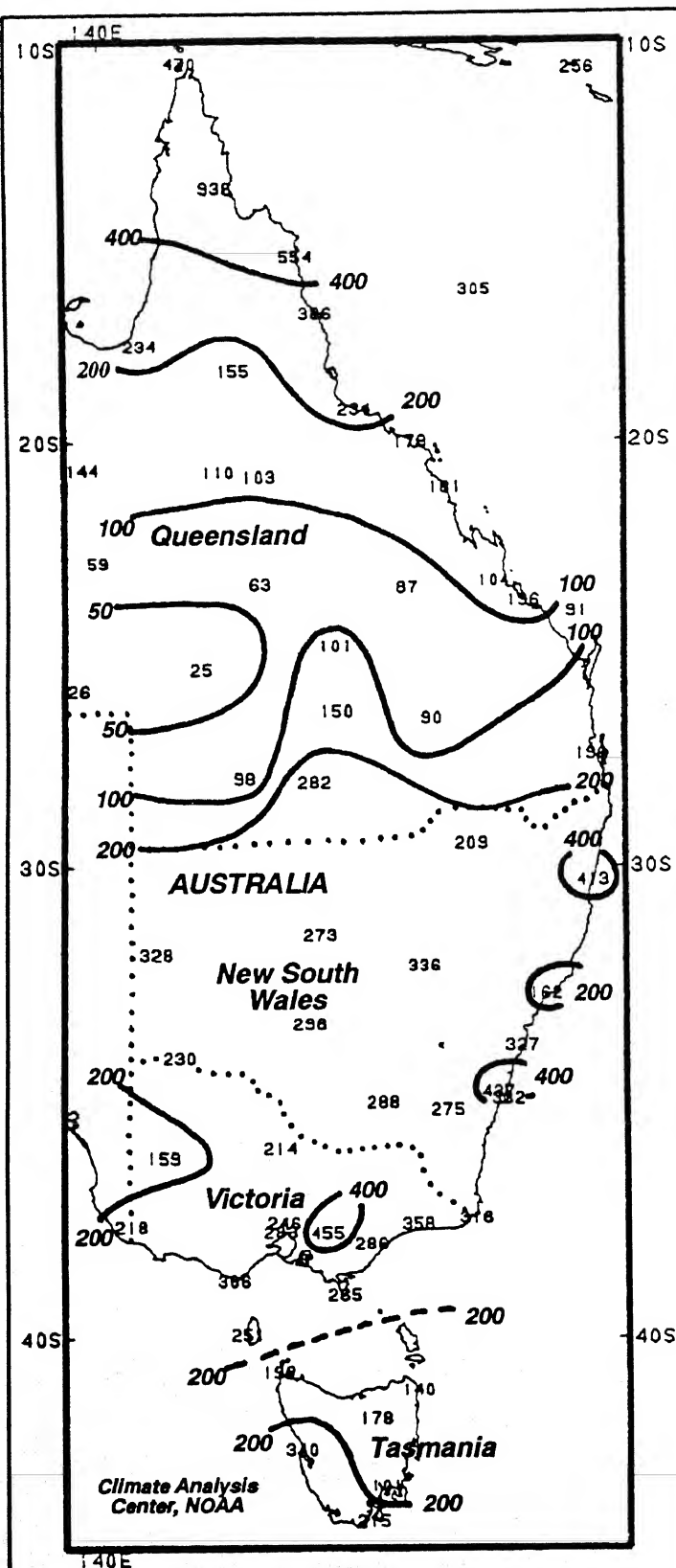


FIGURE 2. Total Precipitation across Eastern Australia, October 1, 1992–January 2, 1993 [94 days]. A station required at least 75 daily reports (80%) for inclusion. Isoleths drawn for 50, 100, 200, and 400 mm. Less than 50 mm of rain dampened portions of south-central and southwestern Queensland, where totals are typically rather low. In contrast, slowly-moving Tropical Storm Nina dropped inundating rains (approaching 700 mm at a few locations) on parts of the Cape York Peninsula, increasing season-to-date totals to as high as 938 mm.

covered a majority of the region during October, except Natal and southern South Africa.

Conditions improved markedly as November progressed in most areas. Copious precipitation began falling across Orange Free State, Natal, the Transvaal, Zimbabwe, eastern Botswana, and southern Mozambique in early November, and has continued with only brief interruptions into 1993. December proved to be exceptionally wet throughout the aforementioned regions, particularly during mid-month. December 13–19, 1992 brought 50–150 mm of rain to the eastern Transvaal and southern Mozambique, then 100–200 mm were recorded across northern and central Zimbabwe and southern Mozambique during the following week. According to press reports, the heavy rains in parts of Zimbabwe sent the Hoya River out of its banks, isolated numerous remote villages, and took over 50 lives (due to contaminated drinking water, drowning, and the emergence of crocodiles from overfilled rivers).

In contrast, an increase in rainfall across central and northern Mozambique in late November and December did not eliminate the moisture deficits accumulated earlier in the wet season. According to press reports, the severe drought during the last (1991–1992) wet season, the slow start to the current wet season, and the ongoing civil war have combined to produce severe food shortages throughout the country. Farther west, no reliable data is available from Angola, Zambia, or Malawi, but press reports indicate that a late start to the wet season has been observed, exacerbating the conditions created by last season's severe drought, including a dramatic reduction in hydroelectric power generation. Rainfall totals are typically rather low during October 1–January 2 across western Botswana and most of Namibia, where subnormal amounts ranging from only a trace to 120 mm fell (except near Walvis Bay – see Figure 3)

EAST-CENTRAL SOUTH AMERICA (Figures 5 and 6):

Similar to the 1991–1992 wet season, most locations recorded near to above normal rainfall since October. The first month of the season was unusually damp across central Brazil, northeastern Argentina, and southern Paraguay while subnormal amounts of rain were recorded through northern Uruguay, central Argentina, and northwestern Argentina. Southern Brazil started off dry in early October, but had received near normal October totals by the end of the month.

Abnormally dry conditions persisted across northern Uruguay through November, covering adjacent sections of Rio Grande do Sul and Argentina as well. Farther north, heavy precipitation developed across Bolivia, but drier conditions prevailed through southern Paraguay.

December brought inundating rains to Bolivia and Argentina. Deluging precipitation triggered a landslide that took hundreds of lives in a Bolivian mining camp in mid-December. Meanwhile, heavy rains may have damaged some of the Argentine wheat crop that had not been harvested by December, according to press reports, and also delayed linseed harvesting. Previously favorable conditions, however, abetted the early harvesting of much of the wheat as well as the sowing of maize, soybean, and sunflower seeds. Farther east, December brought continued subnormal rainfall to northern Uruguay and adjacent Argentina and Brazil until heavy showers dropped up to 300 mm of rain on most of the region last week. To the northeast, unusually dry conditions covered eastern Santa Catarina and most of Parana and Mato Grosso do Sul beginning in late November, allowing most locations to accumulate only 30% to 75% of normal season-to-date rainfall.

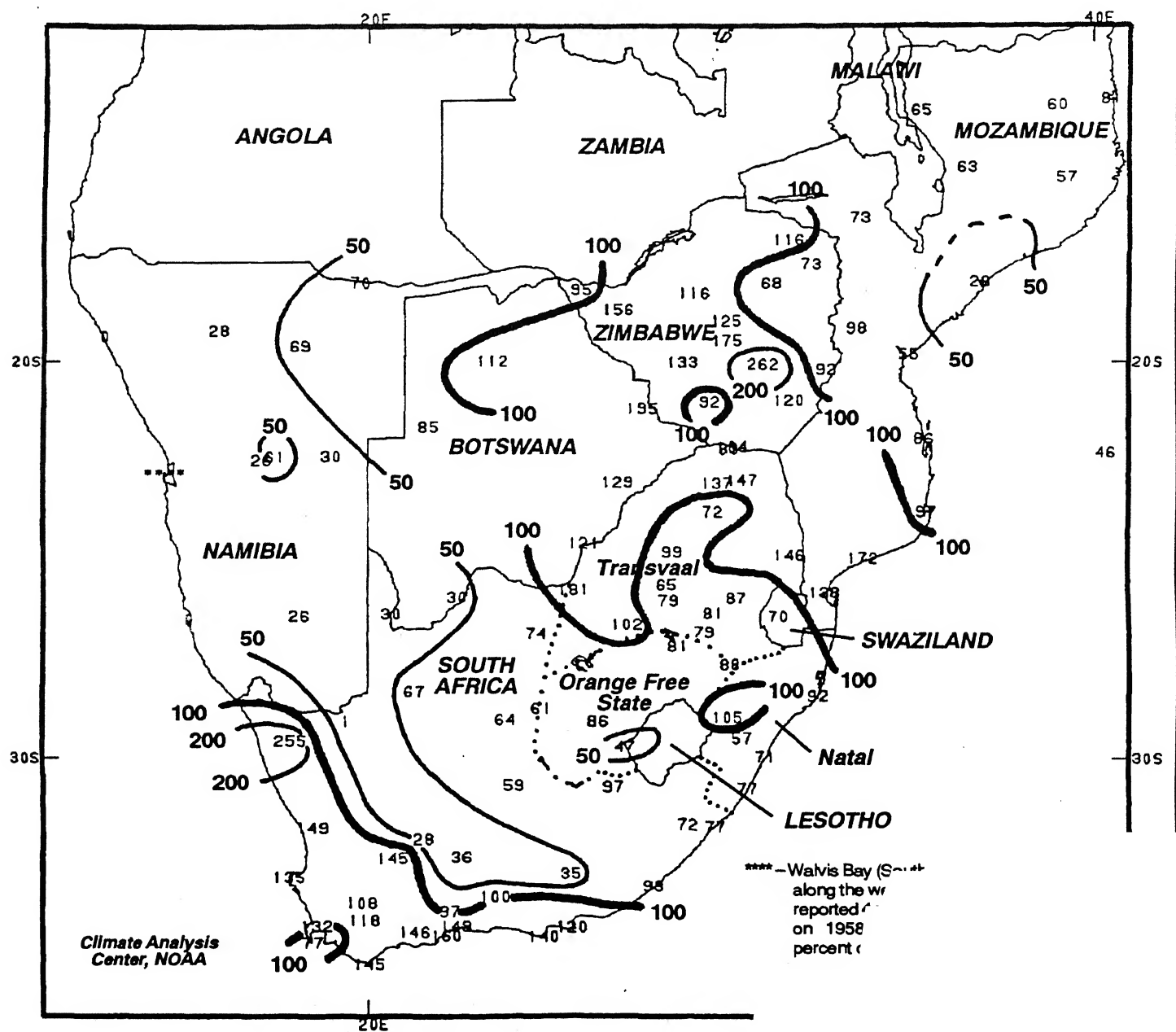


FIGURE 3. Percent of Normal Precipitation across South Africa station required at least 75 daily reports (80%) for inclusion. In contrast to last wet season (1991–1992), abundant rainfall was observed in southern Mozambique, eastern Botswana, and most of Zimbabwe. Abundant rainfall was also observed in southern Africa, western Botswana, and much of Namibia (where totals are typically less than 100%).

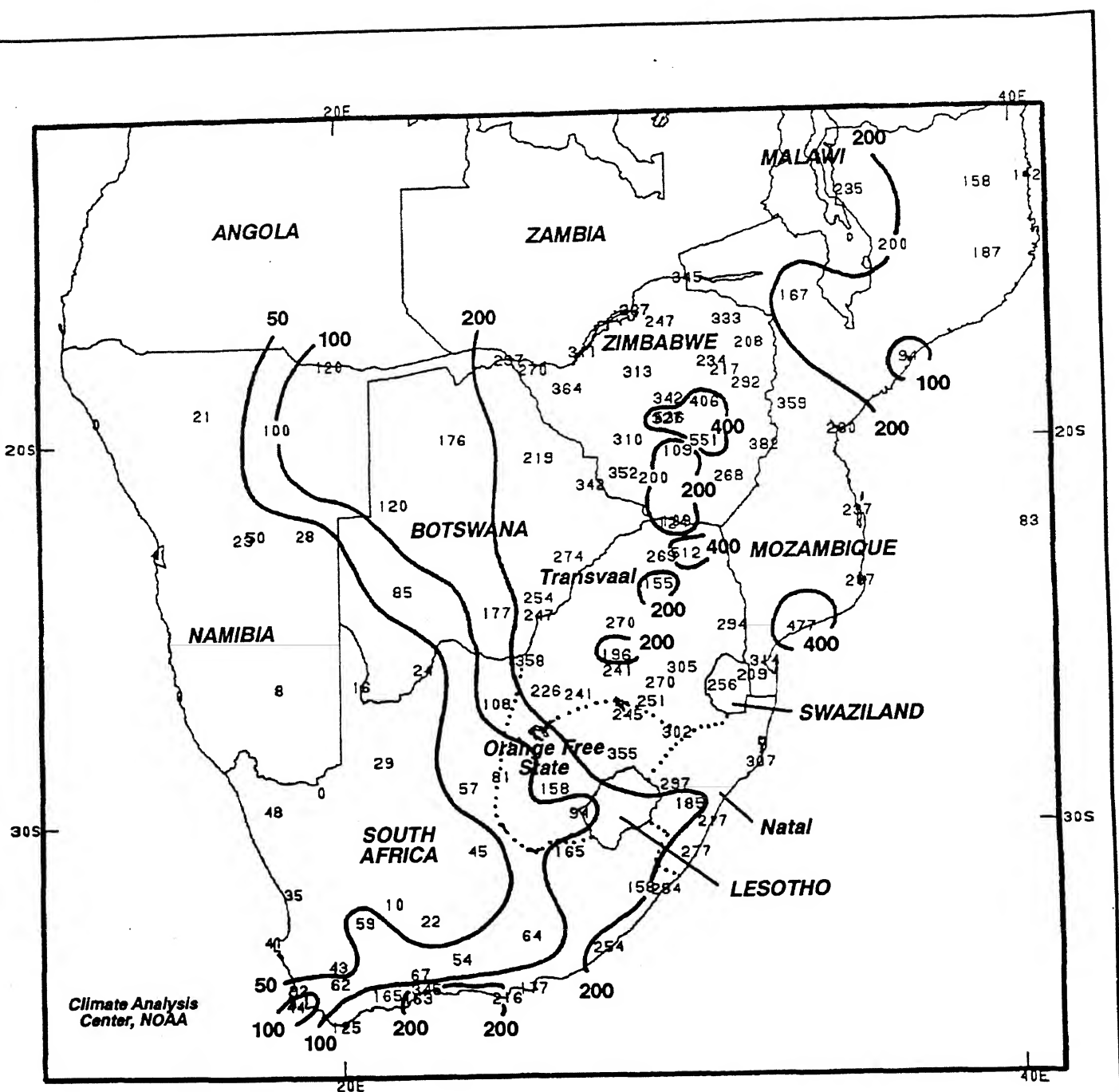


FIGURE 4. Total Precipitation across Southern Africa, October 1, 1992 – January 2, 1993 [94 days]. A station required at least 75 daily reports (80%) for inclusion. Isopleths drawn for 50, 100, 200, and 400 mm. Across the western half of southern Africa, rainfall totals increased from west to east, ranging from little or none in northwestern South Africa and southern and western Namibia to over 200 mm along parts of the southern South African coast and over eastern Botswana. Farther east, amounts under 200 mm were restricted to northeastern Mozambique and scattered sections of southern Zimbabwe and the central Transvaal. Meanwhile, totals topped 500 mm in the northern Transvaal and central Zimbabwe.

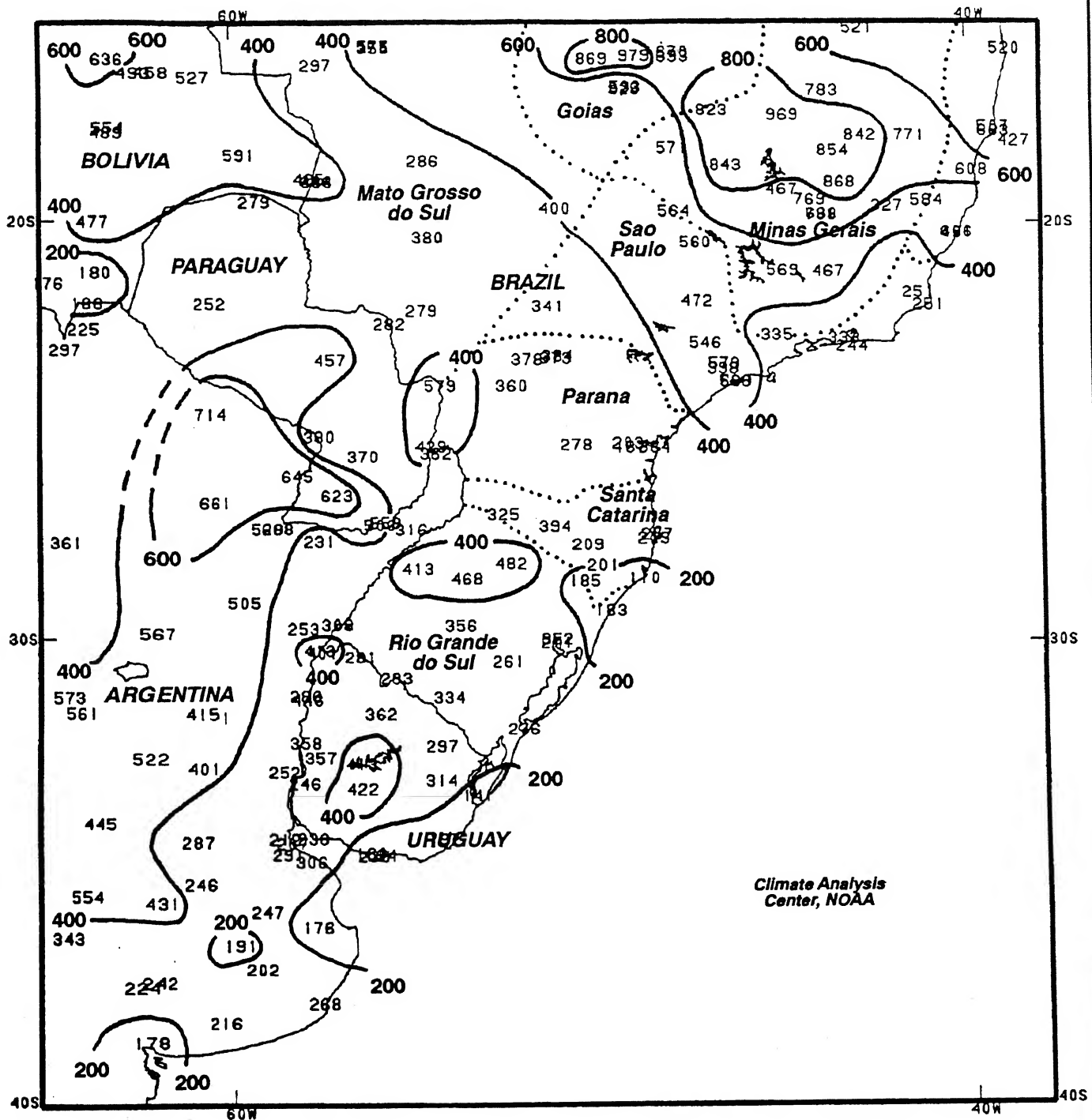


FIGURE 6. Total Precipitation across East-Central South America, October 1, 1992 – January 2, 1993 [94 days]. A station required at least 75 daily reports (80%) for inclusion. Isopleths drawn for 200, 400, 600, and 800 mm. Over 600 mm of rain drenched northern Argentina and extreme southern Paraguay while amounts of up to 980 mm were reported across central Minas Gerais and southern Goiás, where totals are normally higher. In contrast, under 200 mm of rain dampened extreme southwestern Santa Catarina and adjacent Rio Grande do Sul, coastal southeastern Uruguay, scattered locations across east-central Argentina, and southern Bolivia.

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